Marks Scored:

KATHMANDU UNIVERSITY
End Semester Examination
August, 2018

Level : B. Tech.
Year : III
Course : BIOT 307
Semester : II

Exam Roll No. :
Time: 30 mins.
F. M. : 20

Registration No.:
Date AUG 1 2 2018

SECTION "A"
[10 Q. × 1 =10 marks]

Choose the most appropriate answer.

1. It is a strong, specific, beneficial interaction essential for the survival of both partners.
[ ] Commensalism [ ] mutualism [ ] Synergism [ ] protocooperation

2. Resistance to antibiotics and heavy metals are often genetically transmitted to other members of the population represents,
[ ] Cooperative interaction [ ] Amensalism
[ ] Negative interaction [ ] competition

3. When organisms within a habitat modify the habitat in such a way that permit new populations to develop is
[ ] Autogenic succession [ ] Allogenic succession
[ ] Autotrophic Succession [ ] Heterotrophic Succession

4. It is an aerobic biological treatment system which consists of a sludge return line from the secondary settling tank to the aeration tank and an excess sludge waste line.
[ ] Oxidation ditch [ ] activated sludge
[ ] Trickling filter [ ] Rotating biological contractor

5. Which of the following compounds is MOST likely to be degraded rapidly in soils or water?
[ ] 2,4-dichlorophenol [ ] Pentachlorophenol
[ ] 2,4,5-trichlorophenol [ ] 2,4,6-trichlorophenol

6. Which of the following bacterium is called as the superbug that could clean up oil spills
[ ] *Pseudomonas aerogenosa* [ ] *Pseudomonas putida*
[ ] *Pseudomonas denitrificans* [ ] *Pseudomonas fluorescence*

7. The process of extracting metals from ore bearing rocks is called
[ ] bioextraction [ ] bioremediation [ ] biotransformation [ ] bioleaching

8. The activated sludge system in which the diffusers or aeration devices are spaced closer together at the head end of the tank to match the oxygen demand is,
[ ] Extended aeration [ ] step fed/aeration
[ ] Tapered aeration [ ] contact stabilization

9. A full-scale technology in which excavated soils are mixed with soil amendments, placed on a treatment area, and bioremediated using forced aeration.
[ ] Bioventing [ ] Composting [ ] Biopile [ ] Land farming

10. The following microorganisms have wide application in microbial pesticides, except;
[ ] *Baculoviruses* [ ] *Bacillus thurengenesis*
[ ] *Bacillus popilliae* [ ] *Elsiniafetida*

SECTION "B"

[10 Q × 1=10 marks]

Fill in the blanks.

11. According to_____, both positive and negative interactions may occur even within a single population.

12. Within a community, positive interactions tend to optimize the utilization of the available resources, and negative interactions act as_____.

13. In natural inland waters, one type of pollution that can be of considerable concern is that caused by the presence of excessive inorganic nutrients termed as _____.

14. Plant roots have a direct influence on the composition and density of the soil microbial community known as the_____.

15. _____is a model ecosystem that mimics the situation in the aquatic ecosystem.

16. _____assay provides a measure of the levels of biologically degradable organic material present in water.

17. _____consists of a bed of highly permeable media to which microorganisms are attached and through which wastewater is percolated.

18. _____grow in the anaerobic mud of a water environment and reduce sulfate compounds to hydrogen sulfide.

19. The process of converting environmental pollutants into harmless products by naturally occurring microbes is called_____ bioremediation.

20. The first patented bacteria in bioleaching is _____.

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SECTION "C"
(Long answer questions)
[4 Q × 7 =28 marks]

Attempt *ANY FOUR* questions.

1. What is Environmental Biotechnology? Comprehend the current environmental issues with the importance of biotechnology in environmental management.

2. Explain the principle and mechanism of activated sludge technology. Compare and contrast the tapered and step fed activated sludge technology.

3. What are xenobiotic compounds? Explain the factors that influence biodegradation of xenobiotic compounds.

4. Describe different practices/ stages to be considered in successful sanitary landfill process.

5. What is bioremediation? Compare and contrast *in situ* and *ex situ* bioremediation technology.

SECTION "D"
(Short answer questions)

Attempt *ALL* questions.

6. List the biochemical activities that take place in an anaerobic sludge digester [5]

7. What is rhizosphere effect? Emphasize its role in plant productivity. [4]

8. Why the nitrifying, iron and sulphur bacteria are considered important in sanitation technology? [4]

9. Draw a complete flow diagram of a sewage treatment processes. [4]

10. If a 2% solution of sewage sample is incubated for 5 days at 20 degrees Celsius & the depletion of oxygen was found to be 5 mg/l, what would be the BOD of the sewage? [2]

11. Differentiate between (*ANY TWO*) [2 × 2 = 4]
    a. Active and passive composting
    b. Biopile and biovent
    c. rapid and slow sand filtration

12. Short notes on: (*ANY TWO*) [2 × 2 = 4]
    a. Biocontrol agent
    b. Biosorption
    c. Reed Bed technology